North American Technology and Industrial Base Organization (NATIBO) Workshop (Synopsis)
MIT Faculty Club, Boston MA
24 June 2008

The North American Technology and Industrial Base Organization (NATIBO) in conjunction with its annual Steering Committee Meeting held a workshop at the Massachusetts Institute of Technology on June 24, 2008. The workshop provided attendees an opportunity to hear from leaders in government, academia and industry discussing topics related to:

- Best practices in conducting technology transfer in a collaborative, international environment.
- The role of government-to-government organizations in facilitating collaborative technology development and transition.
- Managing technology in a cross-border enterprise (companies with multinational operations).
- Addressing barriers to international collaboration in a defense technology/industrial base project.

The speakers provided valuable insights and gave the meeting participants an excellent opportunity to better understand the complexities US and Canadian government and commercial organizations encounter in conducting and managing defense technology development and transfer in the international environment. NATIBO plans to use the discussion and ideas generated in the workshop to improve advocacy of collaborative international vehicles and streamline processes to initiate and conduct projects that leverage resources between the respective Departments of National Defense.

The audience included representatives from DoD, HQ DND, the Services, Defense Agencies, Industry Canada and others.

Collaboration:

- US industry is overly cautious, assuming a *"better safe than sorry"* approach towards export control compliance.
    - US companies are not taking advantage of established regulatory and legislative "headroom."
    - Processes already in place need to be leveraged to facilitate tighter coupling.
    - Internal corporate coordination cycles, put in place to maintain assured compliance with mandated export control requirements, can be as lengthy as the Government's licensing processes.
    - Licensing cycle times, compromise US competitiveness.

- The Joint Strike Fighter (JSF) Program was cited as an example of a major acquisition that has significant challenges due to cross border expertise from nine countries being integrated into a single platform.
    - Web based security issues exist within a multinational program, imposing firewall and/or layered partitioning requirements to control access.
    - Sustainment on international programs is complicated by trade issues and export control regulations.
        - Planning needs to occur up front during the acquisition development cycle to mitigate issues associated with information exchange (design/test data, tech orders, procurement packages, etc.) and materiel support (spare/repair parts).
        - Recurring/timely assessment movement through the repair cycle impeded by export control constraints.
- Need to extend our industrial base/enterprise to our National Security partners.
    - Need integrated strategies which embrace our coalition partners.
    - Interoperability mandates information exchange/technology access.
- Multiple vehicles exist to help promulgate US/Canadian collaboration, including the Foreign Comparative Testing Program.
- United States Foreign Military Sales (FMS) is an effective approach for achieving tighter coupling/mitigating International Traffic in Arms Regulations (ITARs) constraints.
    - Primary drawback - the FMS Program imposes a 3% surcharge which can be significant burden for a major weapon system acquisition.
    - Debatable as to whether or not FMS is more efficient than industry direct sales.

Technology:

- Commercial sector drives numerous sectors – most notably electronic based technologies.
    - Example used: cell phone technology requirements/advancements are a big driver (1-year cycle) for radio frequency components.
        - Conservative posture imposed upon business development champions.
        - Commercial original equipment manufacturers don't want to be burdened with a supplier whose product line is defense trade sensitive.
        - Defense trade considerations limit new product design and market penetration.
    - Difficult for trade regulations to maintain pace with technology advancements.
    - Dual use suppliers face significant challenges because of incurred regulatory constraints, involving the Departments of Commerce, State and Defense.
- Commercial standards that facilitate what is and isn't military unique vary between disciplines--e.g., medical and engineering.
    - Increased use of standards could facilitate export activities.

    - Standards are recognized; however, need better test methodologies and certifications.
- Foreign students possessing high-end academic credentials possess significant intellectual capital; however, we're constrained in how we can leverage their expertise.
- Foreign national presence impedes technology exploitation at the next higher assembly.
- Information exchange barriers constrain technical creativity.
    - Established requirements constrain collaboration, including meetings and discussion.
    - Technical Assistance Agreements are key collaboration enabler, ensuring legal compliance.
- Cooperative Research and Development Agreements are a common vehicle to establish collaborative research projects with foreign companies and academia.
- Small Business Innovative Research investments are a valuable tool to facilitate access to leading edge technology.

Barriers:

- US enterprises are at risk of losing export trade business due to control constraints.
    - Need to better define/understand the objectives associated with our trade policies.
    - Need to examine impeded trade vs. trade security (what is the real intent behind our trade policy).
- Inconsistent interpretations of US trade laws and regulations is a systemic problem.
    - Canada has relevant trade constraints, including export licenses.
    - Prevailing US business practices are not aligned with established Canadian/US Exemptions—e.g., build to print information exchange.
- Export Controls:
    - The General Accounting Office (GAO) recently released an export controls report, GAO-08-710T, emphasizing the need for basic steps to be taken by the State and Commerce Departments to improve the responsiveness of business process and better protect national interests; http://www.gao.gov/new.items/d08710t.pdf
    - Export Control compliance rigor impedes seeking foreign partnerships across all enterprises (government labs, industry and universities).
    - Export control constrains collaboration, affecting research and development efforts across national boundaries.

Other:

- International Trade and Export Control policy should reflect reality.
    - Myth: Fundamental technology control does not impose a lock on technology exploitation.
    - Technology exploitation availability is pervasive - the US does not have a lock on technology.
    - We're eroding our industrial base through defense trade constraints and limiting joint ventures with our close allies.
    - Can be a "two-edge sword" – e.g., Japanese government is tightening their export controls limiting availability of critical materials such as silicon carbon fiber.
    - We need to dominate ubiquitous technologies
    - Dual use technologies available in the global market need to be categorized and administered as commercial.
        - US tends to over emphasize military attributes, jeopardizing commercial business applications.
        - Commercial enterprises have assumed a least-resistance strategy, avoiding military sensitive product lines which hold them hostage.
        - Prudence mandates product coordination.
    - Government needs to facilitate trade vs. functioning in a gatekeeper role.
- International trade considerations necessary for successful collaboration.
    - Don't artificially attempt to introduce companies into the supply chain.
    - Need cooperative MOUs
    - Foreign partners need to share the expenses.
    - Currently, commercial sector leverage has inherent limitations due to dual use constraints.
    - Global R&D is 46% funded within the US---we need strategies to leverage the other 54%.
    - Plan ahead to synchronize technology and regulation cycle times.

Topics for NATIBO consideration:

- Need to engage industrial communities and associations for their inputs and perspectives to help focus NATIBO activities.
- Potential discussion/study topics include:
    - Dealing with Export Controls – Best Practices/Lessons Learned for Program Managers developing, producing and sustaining weapon systems.
    - Export Controls - ITAR and Canadian Exemption allowances.

    - Alternative Fuels Industrial Base Assessment (see attached separate Scope of Work).
    - Define biometrics activity under Homeland Defense Working Group Terms of Reference.
- Reviewing NATIBO membership and participation.
    - In standing forums (Steering Committee, both member and invited).
    - Additional workshops to include industry and other government.

DRAFT

Scope of Work: Industrial Base Assessment of Alternative[1] Fuels for the Department of Defense

Background

OSD Assured Fuels Initiative Vision: DoD/AT&L intends to catalyze commercial industry to produce clean fuels for the military from secure domestic resources using environmentally sensitive processes as a bridge to the future

State of the Union Address, January 31, 2006: "America is addicted to oil, which is often imported from unstable parts of the world. The way to break this addiction is through technology….New technologies will help us reach another great goal: to replace more than 75 percent of our oil imports from the Middle East by 2025."

Notional USAF Goals: By 2016, 50% of the fuel that the USAF uses in CONUS will be a blend of 50/50 petroleum/alternative fuel (i.e., 25% of all USAF fuels will be non-petroleum-based).[2]

Objective

Conduct an industrial base sector analysis of alternative fuel technologies with emphasis on coal-to-liquid (CTL) conversion processes. This study will include a Business Case Analysis to assess the costs and benefits of the development of a Fischer-Tropsch (F-T) CTL industrial base to produce fuels for the USAF, DOD and commercial sectors. This study will also analyze the business case of applying DOD investment solutions to mitigate technology and business constraints. The ultimate DoD customer includes the warfighter and all personnel who operate and maintain military air and ground vehicles as well as all attendant support equipment and DoD storage/delivery systems.

Stakeholders

This study is sponsored by the Undersecretary of the Air Force for Installations and Environment and Logistics, Deputy Assistant Secretary for Environmental Safety and Occupational Health. The Point of Contact for the Undersecretary is Lieutenant Colonel Don Hickman, SAF/IEE.

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[1] "An alternative fuel is any fuel determined to be substantially not petroleum, (e.g., non crude oil sources for liquid hydrocarbons), that yields energy security benefits and environmental benefits. The term "alternative" fuels, as defined in this handbook, is used to differentiate between kerosene-type jet fuels produced from crude oil and similar fuels produced from alternative sources such as coal, natural gas or biomass." (Ref MIL-HDBK-510-1 (USAF), 28 May 2008 DRAFT)

[2] Paraphrased from sources in ASC's 77 AESW/Alternative Fuels Certification Office and must be substantiated.

Project management is assigned to the Air Force's Industrial Base Assessment program managed out of the Air Force Research Laboratory, Materials and Manufacturing Directorate (AFRL/RX).

A team will be established consisting of representatives from SAF/IE, AFRL (Materials and Propulsion Directorates), ASC's Alternative Fuels Certification Office, other Service/DoD agencies, and the Department of Energy. The Department of National Defence Canada has also expressed an interest in participating in the assessment through the North American Technology and Industrial Base Organization (NATIBO). http://www.acq.osd.mil/ott/natibo/

Assessment Requirements

- Background: Statement of Problem
  - AF Fuel Needs/ Costs
    - Now and by 2016
    - Consumption Trends
    - Budgetary Expenditures and Trends
  - Current Fuel Sources (Domestic vs. Foreign)
- Solution options (assessment will focus on near and near-mid technologies while briefly discussing benefits and limitations of other alternatives)
  - Near term: Fischer-Tropsch (F-T) fuel from coal (0-5 years) (primary topic)
  - Mid-term (5-15 years)
    - Oil shale
    - Other HCs: LNG, ethanol blends, biodiesel
    - *Hydrogen for fuel cells in APUs*
  - *Far-term (15+ years)*
    - *Biomass: black liquor fuels*
    - *Hydrogen fuel for gas turbine engines*
    - *Revolutionary technologies*
- Assessment of current F-T CTL Industrial Base
  - Domestic and foreign companies involved in either research, production or both
  - Supply chain (input materials), production capacity and distribution capabilities
- Estimate of desired state of domestic F-T CTL industrial base by 2016
  - Production needs
    - Number/type/location of plants
  - Raw materials (Coal, Water, Chemicals)
  - Plant output
    - Fuel
    - Power
    - Waste (CO_2 - emphasis will be placed on the disposal/storage of CO_2 waste, Slag, Sulfur)
  - Technology Improvements Needed
    - To aid production
    - To mitigate environmental concerns
      - CO_2 production & disposal/storage
      - Water-intensive process (7 gals of water to 1 gal CTL fuel)

        - Atmospheric emissions
- Current DOD, AF and other Investment plans
    - Current USAF budget year
        - E.g., ASC's 77 AESW/Alternative Fuels Certification Office
    - DOD/AF